

# A CLOSER LOOK



## ...at Kissimmee River Research



*The historic Kissimmee River supported a diverse complement of wading birds like this majestic great egret. District research on the Kissimmee River will be used to evaluate the success of the restoration project in reestablishing the river's natural heritage values. Ongoing studies also will provide a rigorous scientific basis for managing the resources of the restored river and floodplain ecosystem.*

### **Impacts of channelization provide basis for restoration plan**

Studies on environmental resources in the Kissimmee River basin began in the mid-1950s when the U.S. Fish and Wildlife Service initiated annual surveys of wintering waterfowl in the Kissimmee chain of lakes, the river, and its adjacent floodplain wetlands. However, since the 1960s, most environmental research on the river has focused on the impacts of channelization on water quality, wetland and associated fish and wildlife resources in the basin, and the potential value of restoration measures. These studies provided the

basis for the Kissimmee River restoration plan, which will restore 43 miles of river channel, 27,000 acres of floodplain wetlands, and is expected to benefit over 320 fish and wildlife species including the endangered wood stork, snail kite and bald eagle.

### **Ecological evaluation program to track restoration of the river and floodplain**

Current research on the river supports the project's comprehensive restoration evaluation program. The primary purpose of this ecological evaluation program is to evaluate the success of the restoration project in

### **In review...**

- Research on the Kissimmee River is designed to evaluate the success of a comprehensive restoration project.
- Restoration evaluation studies will provide the necessary scientific information for expediting the recovery of wetland, fish and wildlife resources while maintaining flood protection.
- The restoration evaluation program includes a range of ecological components such as fish, wading birds, waterfowl, amphibians, reptiles, invertebrates and wetland plant species.

reestablishing the ecological integrity of the Kissimmee River ecosystem. This goal reflects a desire to restore the river and floodplain so it is once again

project and management of the restored ecosystem.

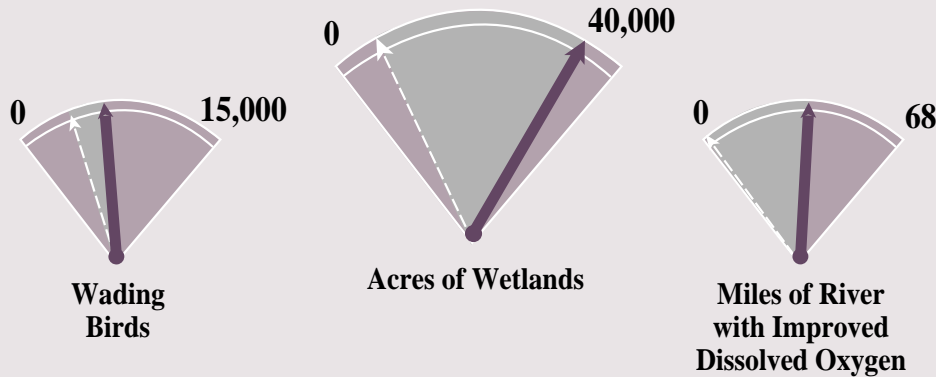
A basic premise of the Kissimmee River restoration project is that the elimination of

communities, and diverse wet prairies. Reestablishment of these wetland habitats will provide early measures of restoration success and will be delineated and mapped through interpretation of aerial photography.

Reestablishment of flow is expected to lead to increased dissolved oxygen levels within the restored river channel. Low dissolved oxygen concentrations are the principal water quality problem and a major source of habitat degradation that limits populations of fish species within the channelized system. Thus, documentation of the effects of restoration on dissolved oxygen regimes will be a focus of water quality investigations.

The next step in the evaluation of the restoration process will be to show cause-and-effect relationships between the reestablishment of these habitat characteristics and expected

### Ecological Integrity Dashboard



*The success of the restoration project in reestablishing ecological integrity will be evaluated using a suite of indicators including wetland area, wading bird populations and miles of river with improved dissolved oxygen levels. Studies will track the recovery of these and other ecological components of the system by measuring response trajectories (gray areas) from the existing, baseline state (dotted-line arrows) toward expected restoration targets (bold arrows).*

capable of supporting the historic ecosystem's complement of fish and wildlife. By closely tracking the recovery of environmental resources, restoration evaluation studies also will provide the necessary scientific information for fine-tuning subsequent phases of the restoration

the flood control canal, water control structures and levees, and the reestablishment of natural water levels and flow will provide the habitat template and driving force for restoration of ecological integrity. A key objective of restoration evaluation studies then is to document that reestablished flow through the

river channel and reunification of the floodplain lead to the restoration of historic habitat characteristics. These characteristics include a meandering river channel with a diversity of depths and natural substrate characteristics (predominantly sand), and a mosaic of wetland plant communities on the floodplain. The historic floodplain was dominated by broadleaf (arrowhead and pickerelweed) marsh, buttonbush and willow shrub



*District and Florida Game and Fresh Water Fish Commission biologists are monitoring population densities of game fish species such as largemouth bass, bluegill and black crappie, which will provide key indicators of restoration of recreational and associated economic values of the river system.*

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responses by a suite of ecological indicators. The selection of indicators for evaluating restoration was based on a prioritization process that favored components of the ecosystem that are expected to show reliable short- and long-term responses, that are efficient to monitor, and that will provide useful information for



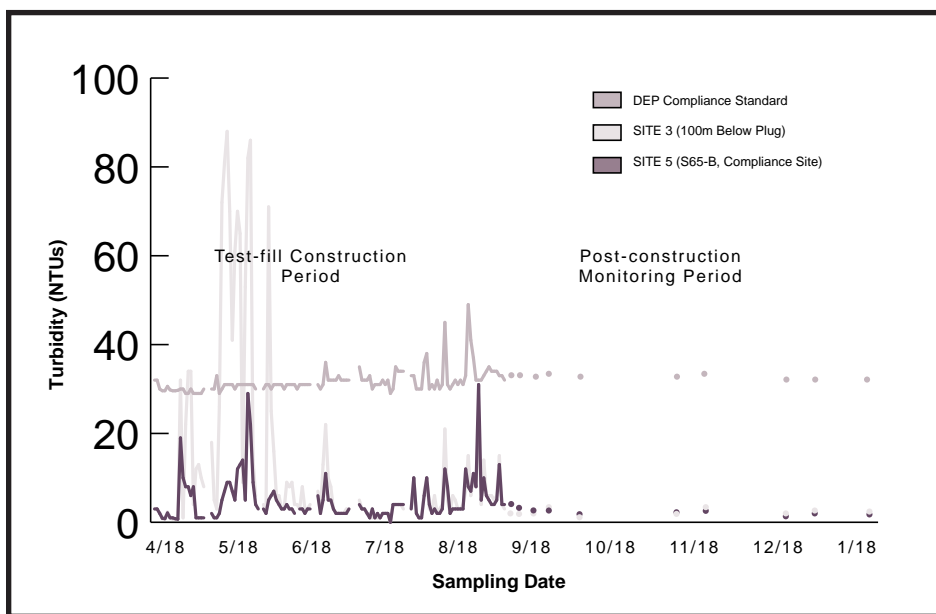
bidity and suspended solids during backfilling, when the spoil from the original canal excavation will be redeposited in the canal. Subsequently, reestablishment of flow could flush accumulated organic deposits in remnant river channels. Both of these concerns were largely

The Kissimmee River restoration project involves massive reconstruction of the system, which must be conducted in an environmentally sensitive manner.

upstream and downstream of the test-fill construction .

### Current research focusing on the Kissimmee River is summarized

Current evaluation studies for the Kissimmee River restoration project are establishing the baseline (pre-construction) database for tracking expected changes and responses. Restoration evaluation studies are led by District staff in collaboration with the U.S. Army Corps of Engineers (Jacksonville District and Waterways Experiment Station), Florida Game and Fresh Water Fish Commission, Archbold Biological Station, and various university researchers. The District's Riverwoods Field Laboratory is the main staging area



Monitoring of the pilot, 1,000-foot, test-fill project showed that water quality impacts of canal backfilling will be limited to the immediate vicinity of the reconstruction and of short duration. This graph shows turbidity levels (Nephelometric Turbidity Units (NTUs)) in the canal during (April-August 1994) and after (September 1994 - January 1995) the test-fill construction, at monitoring sites one-half mile (site 5) and immediately below (site 3) the backfilled canal. The test-fill construction was regulated by the Department of Environmental Protection (DEP) permit compliance standard.

alleviated by evaluation studies during the 1994 pilot test-fill project, which backfilled 1,000 feet of canal and marked the beginning of the dechannelization. Test-fill sampling confirmed that effects of canal backfilling on turbidity and suspended solids will be temporary and localized, as elevated turbidity and suspended solids were detected only intermittently and immediately

for restoration research on the river.

A comprehensive restoration evaluation program is the cornerstone of ongoing research within the Kissimmee River basin. Restoration evaluation studies will document the recovery of fish, wildlife and other ecological resources and provide the necessary information for management of the restored river and floodplain ecosystem.

## What's ahead...

- Determine restoration success by tracking environmental responses from the existing baseline condition to a historically based reference state.
- Continue to monitor water quality and stability of each phase of the restoration project.
- Fine-tune the project to minimize erosion as well as sediment transport from reconstructed features and disturbed areas such as the backfilled canal, spoil banks and new river channel construction.
- Utilize results of restoration evaluation studies to develop management plans for resources of the recovering and restored ecosystem.



For more information on Kissimmee River Research, please contact the SFWMD at (561) 686-8800.

For news on other SFWMD research projects, please see the following *Closer Look* publications:

- AN OVERVIEW OF CURRENT SFWMD RESEARCH
- ESTUARY RESEARCH
- EVERGLADES RESEARCH
- LAKE OKEECHOBEE RESEARCH
- SOUTHERN EVERGLADES AND FLORIDA BAY RESEARCH
- STORMWATER TREATMENT AND SUPPLEMENTAL TECHNOLOGY RESEARCH